

polymerization have been advancing. For example, Kougyou Zairyou (Engineering Materials) Vol. 49, No. 6 pages 53-60 (2001) illustrates reactions of oxetane compound with acyl halide compound, thiol compound, phenol compound and carboxylic acid, and suggests possibility of a new heat-curable resin. Oxetane compounds are being much anticipated to be industrially used in a wider range.

Many other oxetane compounds have been reported. For instance, an oxetane compound having a bisphenol skeleton as substitution for epoxy resin (JP-A-11-130766), an oxetane compound having a fluorene skeleton (JP-A-2000-336082), an oxetane compound having a novolak skeleton (JP-A-2000-336133), an oxetane compound having a naphthalene skeleton (JP-A-2001-31664) and a polyfunctional oxetane compound having a biphenyl skeleton (JP-A-2001-31665) have been disclosed.

An oxetane compound having an ethylenically unsaturated group for the purpose of introducing an oxetanyl group into the side chain of a vinyl-based copolymer is disclosed (JP-A-7-17958 and JP-A-2000-26444).

Further, synthesis methods of a monomer having both an oxetanyl group and a (meth)acryl group are disclosed in JP-A-2000-63371, and JP-A-2003-201286, JP-A-2003-137878 and JP-A-2003-137877.

DISCLOSURE OF THE INVENTION

However, since ethylenically unsaturated groups these oxetane compounds contain are alkenyl ethers, the compounds exhibits low copolymerizability with acryloyl groups or methacryloyl groups (hereinafter, both groups are collectively referred to as "(meth)acryloyl group(s)" in the present specification) which are the most generally employed as radically polymerizable monomers, and therefore it is difficult to efficiently introduce an oxetanyl group into the side chain of a vinyl-based or an acryl-based copolymer.

Further, an oxetane compound having both an oxetanyl group and

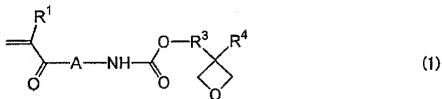
a (meth)acryl group is improved in polymerizability, however, a problem still remains in that, with its adhesiveness to other polymers or materials being poor, its practical properties are low.

Accordingly, an object of the present invention is to provide
 5 a novel oxetane compound which has high practical properties, excellent in copolymerizability with compounds containing (meth)acryloyl groups and production method thereof.

As a result of ardent research, the present inventors found out that an oxetane compound containing a (meth)acryloyl group can be
 10 easily obtained by reacting an isocyanate compound containing a (meth)acryloyl group with an oxetane compound containing a hydroxyl group and that such a compound having a urethane bond is excellent in practical properties such as adhesiveness with other materials. Based on these findings, the present inventors completed the present
 15 invention.

That is, the present invention relates to an oxetane compound containing a (meth)acryloyl group and production method thereof as shown in the following items 1 to 6.

1. An oxetane compound containing a (meth)acryloyl group, which
 20 is represented by formula (1) below.



(In the formula, R^1 represents a hydrogen atom or a methyl group, A represents $-OR^2-$ or a bond, R^2 represents a divalent hydrocarbon group which may contain an oxygen atom in the main chain, R^3 represents a linear or branched alkylene group having 1 to 6 carbon atoms, and R^4
 25 represents a linear or branched alkyl group having 1 to 6 carbon atoms.)

2. The oxetane compound containing a (meth)acryloyl group as